

Lecture II. Developing climate indices: the Climpact App

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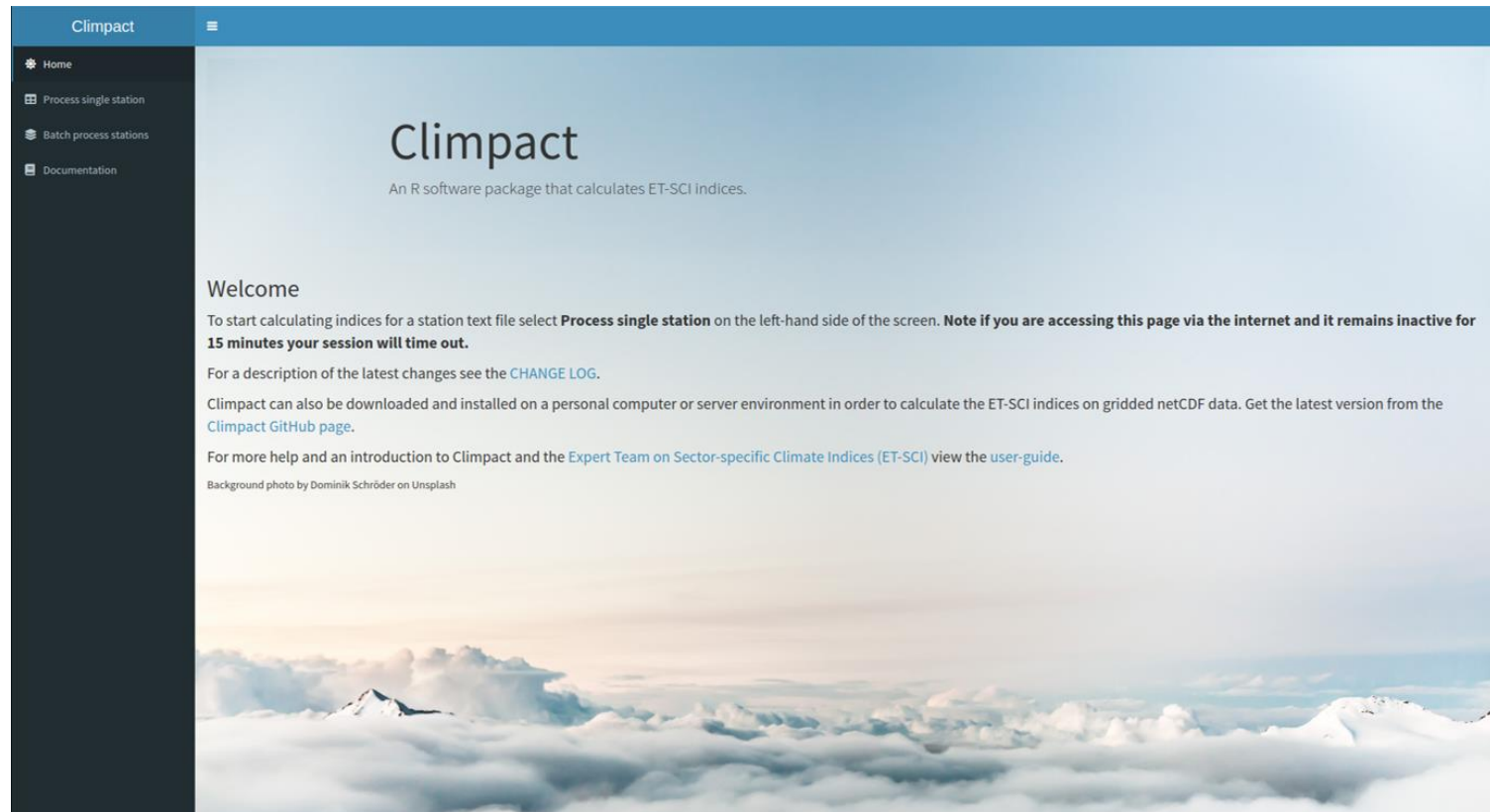
Dr. Jon Olano

Introduction to Climpact

- A software tool for calculating rainfall and temperature indices



The Climpact online tool



- Calculates 60+ climate indices using a **daily time series of precipitation, and maximum and minimum temperature**.
- Open source and free to use.
- Developed at University of New South Wales.
- Based on routines developed at PCIC.
- Can also download and run on Windows, MacOS and Linux.
- Can calculate indices for gridded files (requires download).



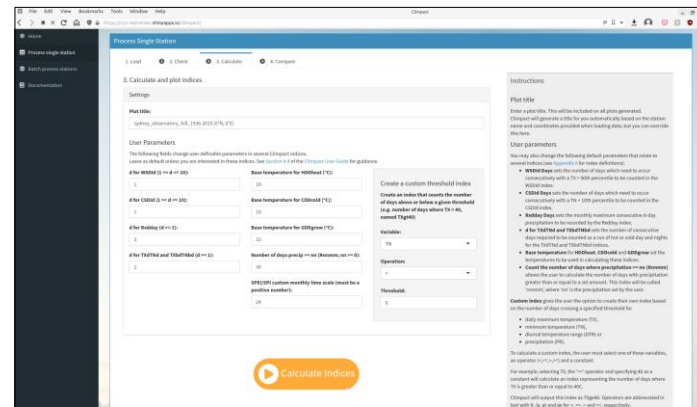
climpact-sci.org

How does Climpact work?

Weather data

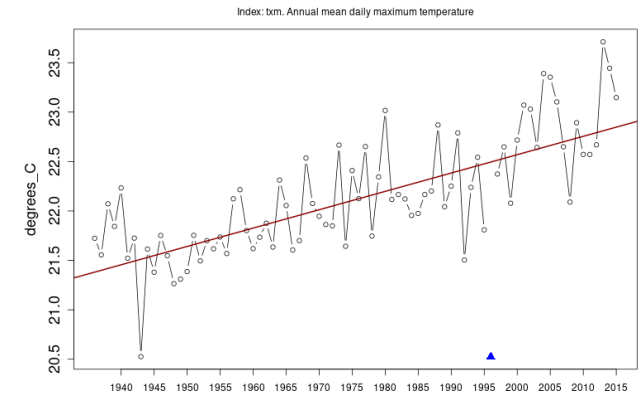
1936	1	1	0.3	23.7	18.7
1936	1	2	0.5	24.1	17.7
1936	1	3	0	25	19.7
1936	1	4	0	25.6	20.6
1936	1	5	23.9	19	16.1
1936	1	6	8.1	21.7	17.8
1936	1	7	0.3	19.5	16.2
1936	1	8	7.4	21.8	16.7
1936	1	9	0.5	22.9	18.2
1936	1	10	0	25.4	19.1
1936	1	11	1.8	24.3	17.9
1936	1	12	0.8	25	20
1936	1	13	19.6	-99.9	-99.9
1936	1	14	20.6	21.6	16.2
1936	1	15	0.3	25.3	17.3
1936	1	16	0	36.9	20.6
1936	1	17	8.4	21.5	19.3
1936	1	18	20.8	21.5	15
1936	1	19	0.3	23.1	13.9
1936	1	20	0	25.1	16.7
1936	1	21	0	25.6	19.7
1936	1	22	0	25.7	19.4
1936	1	23	0	27.3	19.8
1936	1	24	0	28.6	19.1
1936	1	25	0	25.6	21.2
1936	1	26	0	26.7	21.9
1936	1	27	0	27	19.7
1936	1	28	0	29.5	21.5
1936	1	29	0	-99.9	-99.9
1936	1	30	0.5	22.4	17.3
1936	1	31	0	22.6	17.7
1936	2	1	0.3	23.9	15.6
1936	2	2	6.6	23.3	17.2
1936	2	3	0	24.8	16.7
1936	2	4	0	26.7	18.4
1936	2	5	0	21.1	19.8
1936	2	6	0	22.1	17.6
1936	2	7	5.1	22.8	17.6
1936	2	8	0.3	24.4	17.6
1936	2	9	0	26.2	18.4

Climpact



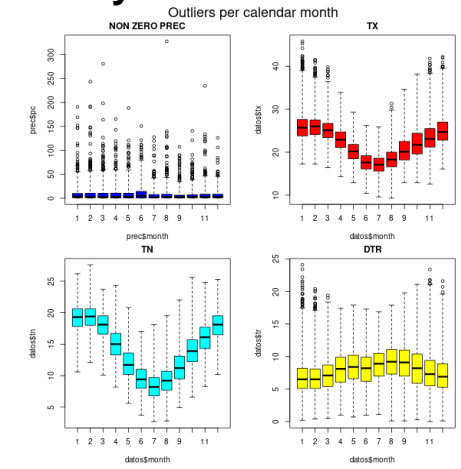
climpact-sci.org

Sector-specific climate indices

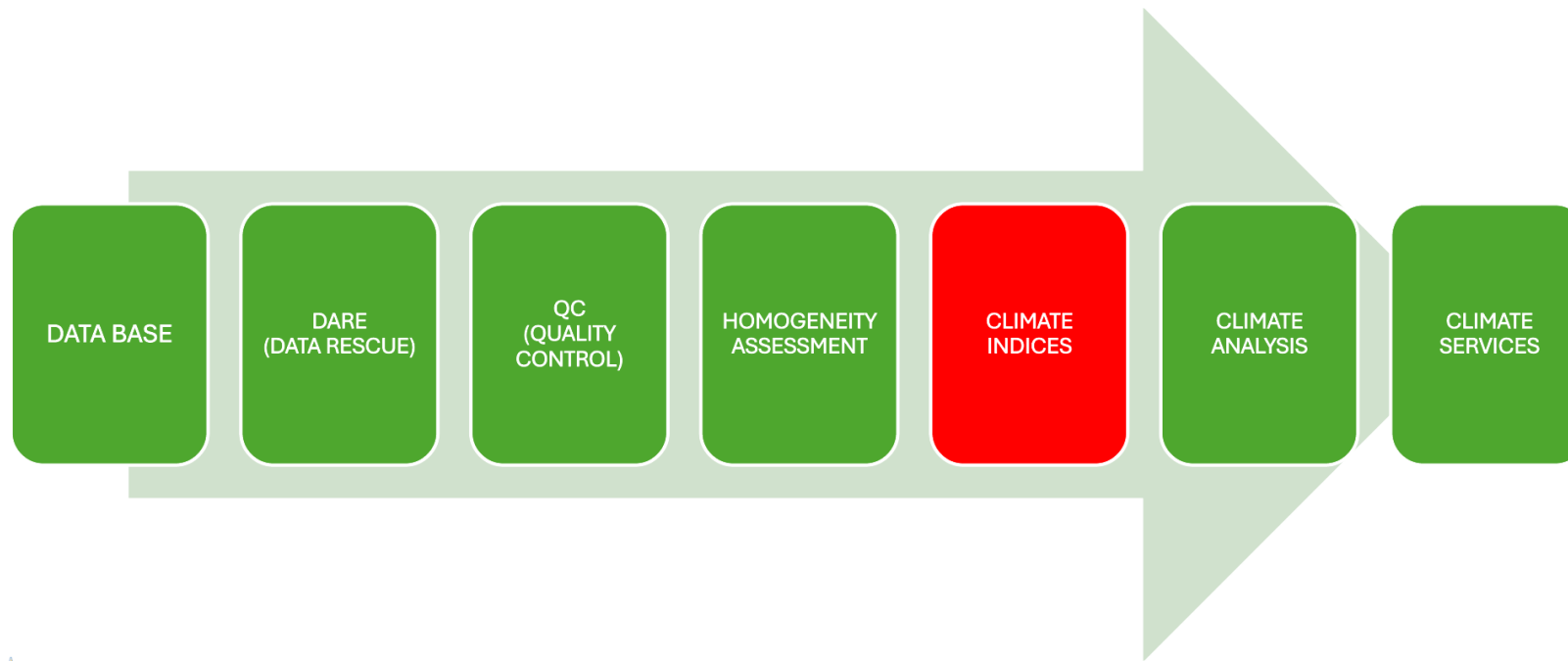


Sen's slope = 0.019 lower bound = 0.015, upper bound = 0.022, p-value = 0
Climpact v3.1.1

Quality control information



How do we need to process station data to calculate Climate Indices



Climpact input format

- Comma or tab separated text file containing daily values of rainfall, maximum temperature and minimum temperature.
- 6 columns. One row per day. Can have a title row. NAN = -99.9.

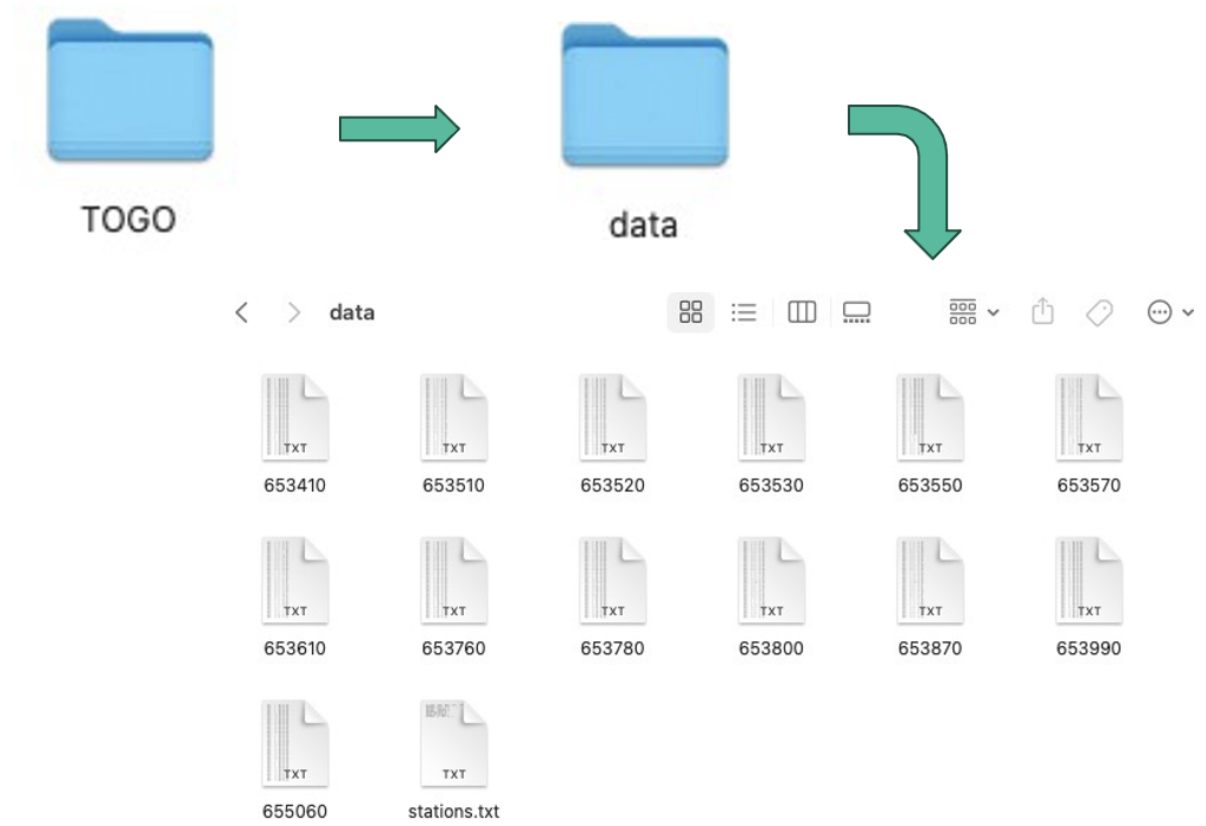
YEAR	MON	DAY	PR	TX	TN
1971	7	1	0	31.7	22.1
1971	7	2	0	30.6	22.1
1971	7	3	0	30.4	22.5
1971	7	4	0.8	31	22.4
1971	7	5	0	31.1	22.9
1971	7	6	0	31.7	22.8
1971	7	7	1	31.7	23.3
1971	7	8	0	30.7	23.3
1971	7	9	0	30.8	22.4

PR = rainfall
TX = max temperature
TN = min temperature

Example Climpact input file format

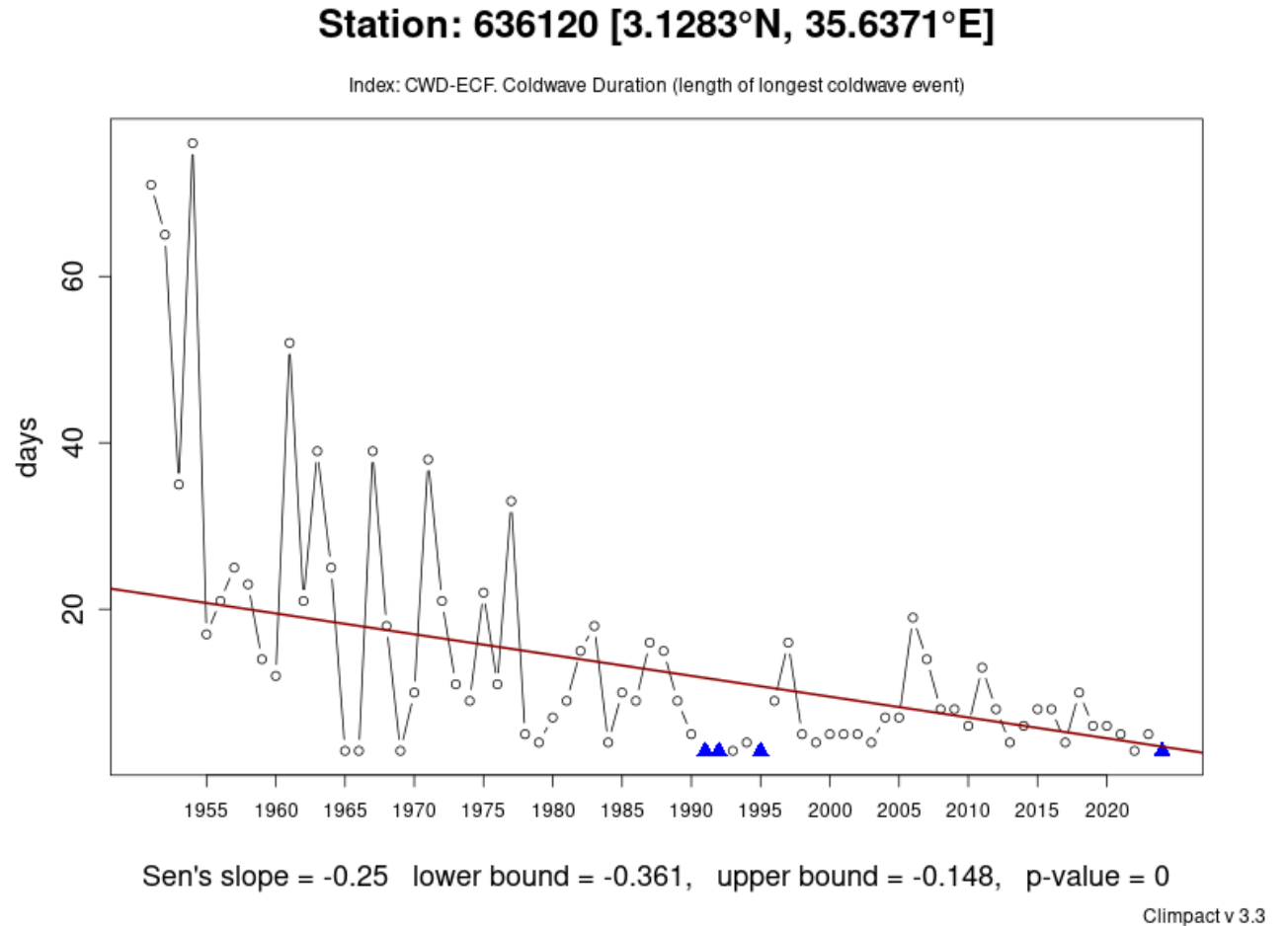
How to store the data

- Create a root folder, for example, with your countries' name
- Put all the files in a directory called "data", located into your root directory



What are climate indices?

- Climate indices help us answering the previous questions and many more
- If we generate a time series of these annual (or seasonal, or monthly) “synthesis” we call “indices”, we can evaluate how they change across the years



Source: Climpact

Why a software such as Climpact?

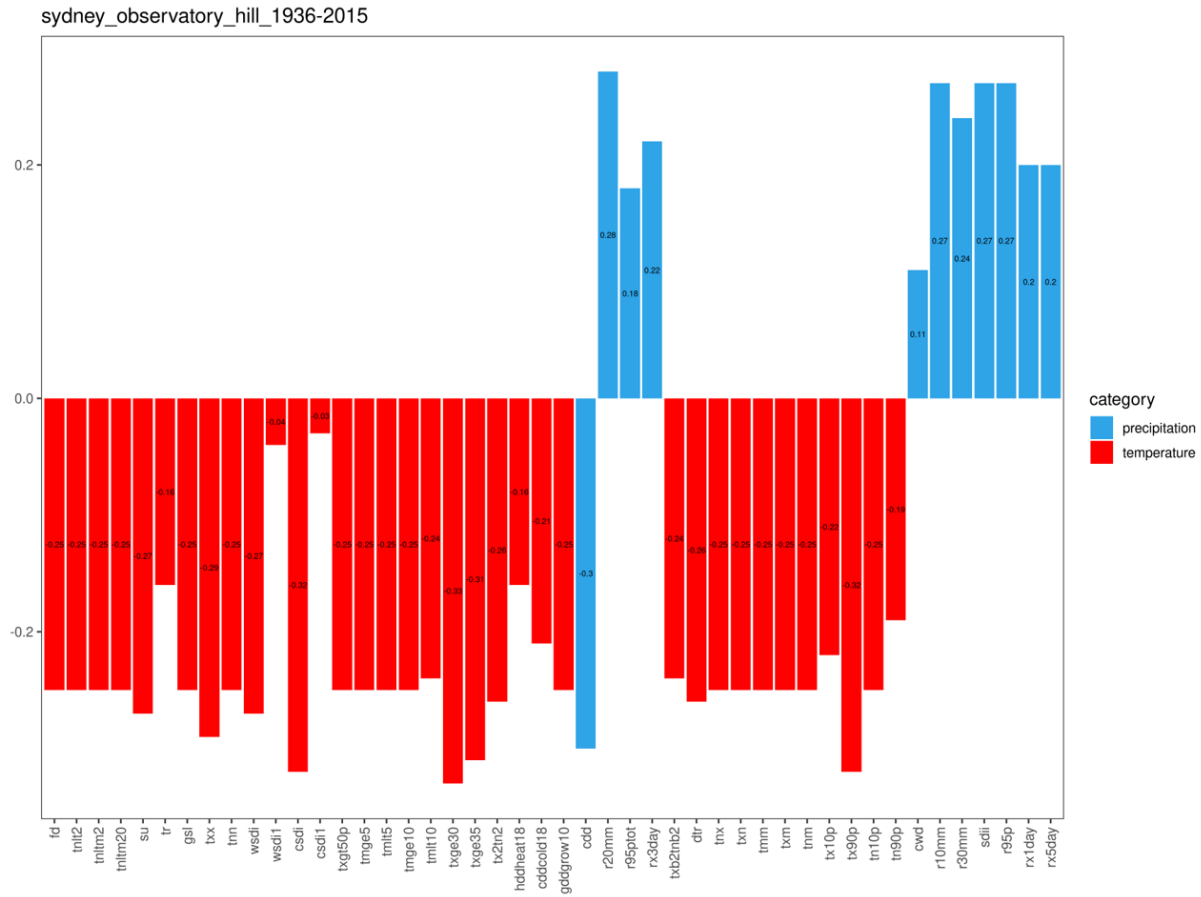
- Open code, free, easy to use
- AND STANDARD we must agree on definitions, e.g:
 - what is a wet day? (≥ 1 mm!)
 - How do we compute percentiles?
 - How many missing days/year can I have to compute an index?
 - How many missing values can I have in the reference period?
 - ...



15.2 9.6
16.6 9.3
17.5 7.9
17.8 7.2
18.9 7.7
17.7 7.3
18.8 5.0
18.8 5.1
23.8 5.4
26.0 10.4
27.2 12.1
27.3 12.1
28.5 9.8
26.0 14.0
24.9 12.2
21.8 12.0
16.0 11.6
16.0 10.8
17.7 10.9
21.6 11.0
25.0 11.2
25.1 12.4
26.2 10.6

Climpact
Quickly calculate climate indices using your own weather and climate data

Correlations with sector data



Where to find more information

- [Climpact website.](#)
- [Climpact online course.](#)
- [Climpact user guide.](#)
- [Climpact github page.](#)



The screenshot shows the Moodle course page for 'Introduction to Climpact: Generating Climate Indices to Support Climate Services'. The page includes a navigation menu on the left with 'Climpact Online', 'Home', and 'Calendar'. The main content area features a header with the course title, a breadcrumb trail 'Home / Courses / Climpact Online', and a banner with four climate-related images: Health, Agriculture, and Water. Below the banner are sections for 'Course Description' and 'How to Take This Course'. A 'Course Glossary' section is visible, with a 'Download the COURSE GLOSSARY' button. The right sidebar contains a 'COURSE MENU' with links to 'HOME', 'Module 1' through 'Module 8', 'Course Glossary', 'Resources and References', 'Acknowledgements', and 'Providing Feedback'. At the bottom right, there is a 'Course completion status' section and a Creative Commons Attribution-ShareAlike 4.0 license notice.

WMO Education and Training Programme

Summary

- Climpact Indices provide useful information on the priority sectors of the GFCS
- Applications across a wide number of sectors
- Flexible according to needs of sectors in specific regions
- Used to understand historical changes as well as make useful predictions for the future

